Level: **Bachelor** Fall 2020/2021
Option: **CS** Exam paper
Course: **ARTIFICIAL INTELLIGENCE**
Course code: CS 4160 **duration: 2 hours**
Course Instructor: **Guy Rostand KOUGANG**
Max mark: **40 marks**

Instructions: Students should attempt all the questions

Set 1: QUESTIONS

Section A: MCQ (20 x 1mark = 20 marks)

For each question, only write the question number followed with the corresponding a. example: **23-F.**
Each question counts for 1 mark

1. What are the main goals of AI?

A. To Create Expert Systems
B. To Implement Human Intelligence in Machines
C. Both A and B
D. None of the Above

2. Which of the following areas can contribute to build an intelligent system?

A. Philosophy
B. Biology
C. Sociology
D. All of the above

3. A computer program with AI can not answer the generic questions it is meant to solve.

A. TRUE
B. FALSE
C. AI is not used to answer question
D. None of the Above

4. Which of the following is not the type of AI?

A. Reactive machines
B. Unlimited memory
C. Theory of mind
D. Self-awareness

5. Which of the following is an application of AI?

A. Gaming
B. Expert Systems
C. Vision Systems
D. All of the above

6. Which instruments are used for perceiving and acting upon the environment?

A. Sensors and Actuators
B. Sensors
C. Perceiver
D. Perceiver and Sensor

7. Which of the following is not a type of agents in artificial intelligence?

A. Model based
B. Utility based
C. Simple reflex
D. target based

8. Which is used to improve the agents performance?

A. Perceiving
B. Observing
C. Learning
D. Sequence

9. Rationality of an agent does not depends on?

A. performance measures
B. Percept Sequence
C. reaction
D. actions

10. Agent's structure can be viewed as ?

A. Architecture
B. Agent Program
C. Architecture + Agent Program
D. None of the Above

11. How many types of agents are there in artificial intelligence?

A. 1
B. 2
C. 3
D. 4

12. Which of these is agent's perceptual inputs at a given instance.

A. Behavior of Agent
B. Percept
C. Percept Sequence
D. Agent Function

13. Rationality is?

A. being reasonable
B. being sensible
C. having good sense of judgment.
D. All of the above

14. What is the full form of PEAS?

A. Perceptual Measure, Environment, Actuators, and Sensors
B. Performance Measure, Environment, Actuators, and Sensors
C. Performance Measure, Entity, Actuators, and Sensors
D. Performance Measure, Environment, Agent Function, and Sensors

15. Which of the following is not Properties of Environment?

A. Discrete / Continuous
B. Static / Dynamic
C. Deterministic / Non-deterministic
D. No agent / Multiple agents

16. What is Initial state + Goal state in Search Terminology?

A. Problem Space
B. Problem Instance
C. Problem Space Graph
D. Admissibility

17. What is Time Complexity of Breadth First search algorithm?

A. b
B. b^d
C. b^2
D. b^b

18. Depth-First Search is implemented in recursion with _____ data structure.

A. LIFO
B. LILO
C. FIFO
D. FILO

19. How many types are available in uninformed search method?

A. 2
B. 3
C. 4
D. 5

20. Which data structure conveniently used to implement BFS?

A. Stacks
B. Queues
C. Priority Queues
D. None of the Above

Section B: Structural questions (20 marks)

1. What is the difference between Strong Artificial Intelligence and Weak Artificial Intelligence? **(2 marks)**

2. What is a cost function? **(2 marks)**

3. List four applications of AI. **(2 marks)**

4. List the programming languages used in AI. **(2 marks)**

5. What is the lifetime of a variable? **(2 marks)**

6. What is Turing test? **(2 marks)**

7.

Pacman's new house

After years of struggling through mazes, Pacman has nally made peace with the ghosts, Blinky, Pinky, Inky, and Clyde, and invited them to live with him and Ms. Pacman. The move has forced Pacman to change the rooming assignments in his house, which has 6 rooms. He has decided to gure out the new assignments with a CSP in which the variables are Pacman **(P)**, Ms. Pacman **(M)**, Blinky **(B)**, Pinky **(K)**, Inky **(I)**, and Clyde
(C), the values are which room they will stay in, from 1-6, and the constraints are:

i) No two agents can stay in the same room
ii) **P** > 3
iii) **K** is less than **P**
vi) **B** is even
vii) **I** is not 1 or 6
viii) |**I**-**C**| = 1
ix) |**P**-**B**| = 2

iv) **M** is either 5 or 6

v) **P** > **M**

(i) Unary constraints On the grid below cross out the values from each domain that are eliminated by enforcing unary constraints. **(3 marks)**

P	1	2	3	4	5	6
B	1	2	3	4	5	6
C	1	2	3	4	5	6
K	1	2	3	4	5	6
I	1	2	3	4	5	6
M	1	2	3	4	5	6

(ii) MRV According to the Minimum Remaining Value (MRV) heuristic, which variable should be assigned to first? **(3 marks)**

P B C K I M

(iii) Forward Checking For the purposes of decoupling this problem from your solution to the previous problem, assume we choose to assign P first, and assign it the value 6. What are the resulting domains after enforcing unary constraints (from part i) and running forward checking for this assignment? **(2 marks)**

P						6
B	1	2	3	4	5	6
C	1	2	3	4	5	6
K	1	2	3	4	5	6
I	1	2	3	4	5	6
M	1	2	3	4	5	6